



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/734,198

12/15/2003

Xintian E. Lin

42339-198341

4797

26694

7590

07/13/2007

VENABLE LLP

P.O. BOX 34385

WASHINGTON, DC 20043-9998

EXAMINER

HAROON, ADEEL

ART UNIT

PAPER NUMBER

2618

MAIL DATE

DELIVERY MODE

07/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/734,198	Applicant(s) LIN ET AL.	
	Examiner Adeel Haroon	Art Unit 2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 18-30 and 35-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18-30 and 35-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/8/07 has been entered.

Response to Arguments

2. Applicant's arguments have been considered but are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 7, 11-15, 19-21, 23, 25-27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lo et al. (U.S. 6,987,958) in view of Pallonen (U.S. 6,408,169).

With respect to claim 1, Lo et al. disclose an apparatus with multiple antennas, element number 201, for connecting to receiver chains, element number 220, and to at least one transmitter chain, element number 215, in figure 2 (Column 3, lines 7-17). Lo et al. teach a switch, element number 210, adapted to couple each receiver chain to a selected beam during reception and the transmitter chain to a selected beam during transmission, so that each receiver chain is coupled to a different beam (Column 3, lines 7-17). Lo et al. further teach in figure 3 a first sub-switch adapted to couple a first beam to a first receiver chain creating a first signal path; a second sub-switch adapted to couple a second beam to a second signal path; and a third sub-switch adapted to couple a selected beam to the transmitter in element 215 creating a third signal path (Column 3, lines 18-51). Lo et al. differs from the applicant's claimed invention in that it uses an analog beamformer 205 and does not directly couple the antennas to the receiver chains and at least one transmitter. However, Pallonen disclose an apparatus with multiple antennas, element numbers 1-4, connectable to receivers, element numbers 9 and 10, using a switch, element number 8, in figure 1 (Column 4, lines 10-21). Pallonen teaches that individual antenna beams are connected to selected receivers based on the quality of the signals (Column 4, lines 34-45). Therefore, it would be obvious to one of ordinary skill in the art to apply Pallonen's selection

technique to the system of Lo et al. so "the selection of the most suitable antenna beam will be significantly easier and the reception conditions of the base station are significantly improved (Pallonen: Column 3, lines 1-6).

With respect to claim 2, Lo et al. disclose the switch works according to a predetermined criterion as controlled by the digital signal processor (Column 3, lines 18-40).

With respect to claim 3, Lo et al. disclose combining the outputs of the receiver chains (Column 3, lines 26-31).

With respect to claims 4, 5, and 7, Lo et al. show in figure 3, that the sub-switches are coupled to all of the plurality of antennas (Column 3, lines 41-51).

With respect to claim 10, Lo et al.'s system has the capability of having a fourth sub-switch adapted to couple a third selected antenna to a third receiver chain (Column 3, lines 18-51).

With respect to claim 11, Lo et al. disclose a system with multiple antennas, element number 201, for connecting to receiver chains, element number 220, in figure 2 (Column 3, lines 7-17). Lo et al. teach a switch, element number 210, adapted to couple each receiver chain to a selected beam during reception so that each receiver chain is coupled to a different beam (Column 3, lines 7-17). Lo et al. further teach in figure 3 a first sub-switch adapted to couple a first beam to a first receiver chain creating a first signal path; a second sub-switch adapted to couple a second beam to a second signal path; and a third sub-switch adapted to couple a selected beam to the transmitter in element 215 creating a third signal path (Column 3, lines 18-51). Lo et al. differs from

the applicant's claimed invention in that it uses an analog beamformer 205 and does not directly couple the antennas to the receiver chains and at least one transmitter.

However, Pallonen disclose an apparatus with multiple antennas, element numbers 1-4, connectable to receivers, element numbers 9 and 10, using a switch, element number 8, in figure 1 (Column 4, lines 10-21). Pallonen teaches that individual antenna beams are connected to selected receivers based on the quality of the signals (Column 4, lines 34-45). Therefore, it would be obvious to one of ordinary skill in the art to apply Pallonen's selection technique to the system of Lo et al. so "the selection of the most suitable antenna beam will be significantly easier and the reception conditions of the base station are significantly improved (Pallonen: Column 3, lines 1-6).

With respect to claim 12, Lo et al. disclose a combiner, element number 230, to combine the outputs of the receiver chains (Column 3, lines 26-31).

With respect to claim 13, Lo et al. disclose a demodulator, element number 240, to receive the combined signal and demodulate the combined signal (Column 3, lines 31-34).

With respect to claim 14, Lo et al. disclose the switch works according to a predetermined criterion as controlled by the digital signal processor (Column 3, lines 18-40).

With respect to claim 15, Lo et al. show in figure 3, that the sub-switches are coupled to all of the plurality of antennas (Column 3, lines 41-51).

With respect to claims 19 and 25, Lo et al. disclose a method that can be executed by a machine readable medium that determines a subset of beams out of a

plurality of beams, using a predetermined criterion and switching signals from said (Column 3, lines 7-40). Lo et al. further teach in figure 3, switching signals from a first sub-switch adapted to couple a first beam to a first receiver chain; a second sub-switch adapted to couple a second beam to a second signal path; and a third sub-switch adapted to couple a selected beam to the transmitter in element 215 creating a third signal path (Column 3, lines 18-51). Lo et al. differs from the applicant's claimed invention in that it uses an analog beamformer 205 and does not directly couple the antennas to the receiver chains and at least one transmitter. However, Pallonen disclose an apparatus with multiple antennas, element numbers 1-4, connectable to receivers, element numbers 9 and 10, using a switch, element number 8, in figure 1 (Column 4, lines 10-21). Pallonen teaches that individual antenna beams are connected to selected receivers based on the quality of the signals (Column 4, lines 34-45). Therefore, it would be obvious to one of ordinary skill in the art to apply Pallonen's selection technique to the system of Lo et al. so "the selection of the most suitable antenna beam will be significantly easier and the reception conditions of the base station are significantly improved (Pallonen: Column 3, lines 1-6).

With respect to claims 20 and 26, Lo et al. disclose combining the outputs of the receiver chains (Column 3, lines 26-31).

With respect to claims 21 and 27, Lo et al. show in figure 3, that each receiver chain may receive signals from any one of the plurality of antennas (Column 3, lines 41-51).

With respect to claims 23 and 29, Lo et al. disclose switching a transmit power amplifier to be connected to any one of the plurality of antennas (Column 4, lines 12-23).

5. Claims 6, 22, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lo et al. and Pallonen further in view of Evans et al. (U.S. 2003/0083016 as provided by applicant).

With respect to claim 6, the modified apparatus of Lo et al. and Pallonen is described above in the discussion of claim 4. Lo et al. do not disclose that one sub-switch being adapted to be coupled to all except one of the plurality of antennas. However, Evans et al. disclose a switch system controlling diversity system thus making it analogous art since it is in the same field of endeavor. Evans et al. disclose a sub switch, which is coupled to all the plurality of antennas except one in figure 1 (Paragraph 16). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to apply Evans et al.'s selective sub switch technique to the modified apparatus of Lo et al. and Pallonen in order to provide the choice of the antenna with the best isolation.

With respect to claims 22 and 28, the modified method of Lo et al. and Pallonen is described above in the discussion of claims 19 and 25. Lo et al. do not disclose that one sub-switch being adapted to be coupled to all except one of the plurality of antennas. However, Evans et al. disclose a switch system controlling diversity system

thus making it analogous art since it is in the same field of endeavor. Evans et al. disclose a sub switch, which is coupled to all the plurality of antennas except one in figure 1 (Paragraph 16). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to apply Evans et al.'s selective sub switch technique to the modified method of Lo et al. and Pallonen in order to provide the choice of the antenna with the best isolation.

6. Claims 8, 9, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lo et al. and Pallonen further in view of Nakamura (U.S. 6,243,563).

With respect to claim 8, the modified apparatus of Lo et al. and Pallonen is described above in the discussion of claim 1. Lo et al. further disclose a transceiver, element number 215, that includes a power amplifier in the transmitter chain and also includes a receiver chain (Column 4, lines 12-23). There must be some element separating the transmitter and receiver chains, but Lo et al. do not specifically disclose a second switch. However, Nakamura disclose an apparatus with a plurality of antennas and a switch, element number 4, to separate the transmitter and receiver chain (Column 4, lines 17-35). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to include Nakamura's second switch in the apparatus of Lo et al. in order to provide a separator for the transmitter and receiver chains in the transceiver element.

With respect to claim 9, Lo et al. show in figure 3, that the sub-switches are coupled to all of the plurality of antennas (Column 3, lines 41-51).

With respect to claim 16, the modified system of Lo et al. and Pallonen is described above in the discussion of claim 11. Lo et al. further disclose a transceiver, element number 215, that includes transmitter chain and also includes a receiver chain (Column 4, lines 12-23). There must be some element separating the transmitter and receiver chains, but Lo et al. do not specifically disclose a second switch. However, Nakamura disclose an apparatus with a plurality of antennas and a switch, element number 4, to separate the transmitter and receiver chain (Column 4, lines 17-35). Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to include Nakamura's second switch in the system of Lo et al. in order to provide a separator for the transmitter and receiver chains in the transceiver element.

7. Claims 18, 24, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lo et al. and Pallonen in view of Ohkuba et al. (U.S. 2003/0003937).

With respect to claim 18, the modified system of Lo et al. and Pallonen is described above in the discussion of claim 11. Lo et al. and Pallonen are silent on the discussion of the second transceiver with which the system is communicating. However, Ohkuba et al. disclose a second transceiver, element number 11, which lacks diversity since it has only one antenna, element number 17, adapted to communicate

with a first transceiver, element number 1, which employs antenna diversity in figure 1 (Paragraph 7 and 8). Since the first transceiver communicates with the second transceiver knowing that the first transceiver lacks antenna diversity, the first transceiver must communicate at a data rate accordingly. Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use the modified antenna selection technique in junction with Ohkuba et al.'s transceiver in order to reliably communicate with the second transceiver.

With respect to claim 24, and 30, the modified method of Lo et al. and Pallonen is described above in the discussion of claim 19. Lo et al. and Pallonen are silent on the discussion of the second transceiver with which the system is communicating. However, Ohkuba et al. disclose a system having diversity for reception and transmission in figure 1 and 5 (Paragraph 7 and 8). Also, since the base station communicates with the mobile station knowing that the mobile station lacks antenna diversity, the base station must communicate at a data rate accordingly. Therefore, it would be obvious to one of ordinary skill in the art at the time of the applicant's invention to use the modified antenna selection technique of Lo et al. and Pallonen in junction with Nakamura's base station in order "in order to reliably communicate with the second transceiver.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adeel Haroon whose telephone number is (571) 272-7405. The examiner can normally be reached on Monday thru Friday, 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AH
6/15/07


EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600